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DURHAM, N.H. - Stacia Sower, professor of biochemistry and director of the Center for Molecular and Comparative Endocrinology at the University of New Hampshire, has received a $420,000 grant from the National Science Foundation (NSF) for research on brain and pituitary hormones and receptors.

With the four-year grant, Sower will build upon her decades of NSF-funded research in the fields of hormonal genomics and proteomics. Sower defines the project's focus as concentrating on the molecular, biochemical and functional studies of brain gonadotropin-releasing hormone and pituitary gonadotropins - which govern egg and sperm maturity - in sea lampreys (*Petromyzon marinus*).

"My students and I will test the hypothesis that these hormones and their receptors share common functional and developmental features compared to later evolved vertebrates," says Sower. "In vertebrates,the reproductive master control center is the hypothalamus, a region of the brain that produces hormones that trigger the release of gonadotropin from the pituitary. This is also true in the lamprey, in which we discovered three gonadotropin releasing hormones." These discoveries, says Sower, have led to a new paradigm which looks to the lamprey as an important model for the endocrine system of vertebrates.

The project, which will include undergraduate and graduate students, will examine the roles that modifications in interactive cellular networks, represented by genes and their products (hormones, receptors, and signaling molecules), have on biological function from the perspectives of molecular, cellular and systems biology. These combined data from the proposed studies will be compared to other vertebrate species, including humans.

The sea lamprey is one of the planet's oldest living vertebrates. It has become a model for analysis of several systems, including the evolution of the neuroendocrine regulation of reproduction. For neuroendocrine studies, the availability of the lamprey genome, mapped in 2005, offers rich opportunities for identification of ligands, receptors, transcription factors and signaling pathways.

"The sea lamprey also plays an incredible ecological role in the coastal rivers of New Hampshire and the ocean," says Sower. "They clean up our coastal rivers and the food to fish, birds, and turtles." Sower and her students work with fisheries managers and other regional groups to aid understanding of the species and its importance to the ecosystem.

NSF project reviewers praised Sower's proposal for its "provocative hypothesis" and "impressive and comprehensive set of studies" and remain "enthusiastic about the central goal, rigor of the individual aims, the model system and productivity of [Sower]."

UNH founded the Center for Molecular and Comparative Endocrinology (CME), directed by Sower, in 2008. The foci of the center include environmental endocrinology, reproductive biology and the evolution and regulation of physiological phenomena. The center seeks to expand the capacity and synergism of systems endocrinology and physiology research that links to other areas of UNH and to regional medical schools.

The University of New Hampshire, founded in 1866, is a world-class public research university with the feel of a New England liberal arts college. A land, sea and space-grant university, UNH is the state's flagship public institution, enrolling 11,800 undergraduate and 2,400 graduate students.

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Photographs available to download:
http://www.unh.edu/news/cj_nr/2009/mar/StaciaImage.jpg
Caption: Stacia A. Sower, director of the University of New Hampshire's Center for Molecular & Comparative Endocrinology (CME)
Credit: Center for Molecular & Comparative Endocrinology (CME), University of New Hampshire

http://www.unh.edu/news/cj_nr/2009/mar/cochecoladder.jpg
Caption: Undergraduate and graduate students from the Center for Molecular & Comparative Endocrinology at UNH capture lampreys on the Cocheco River in Dover as they return from the ocean.
Credit: Courtesy of Stacia Sower.